



# Continuous Commissioning Saves Energy

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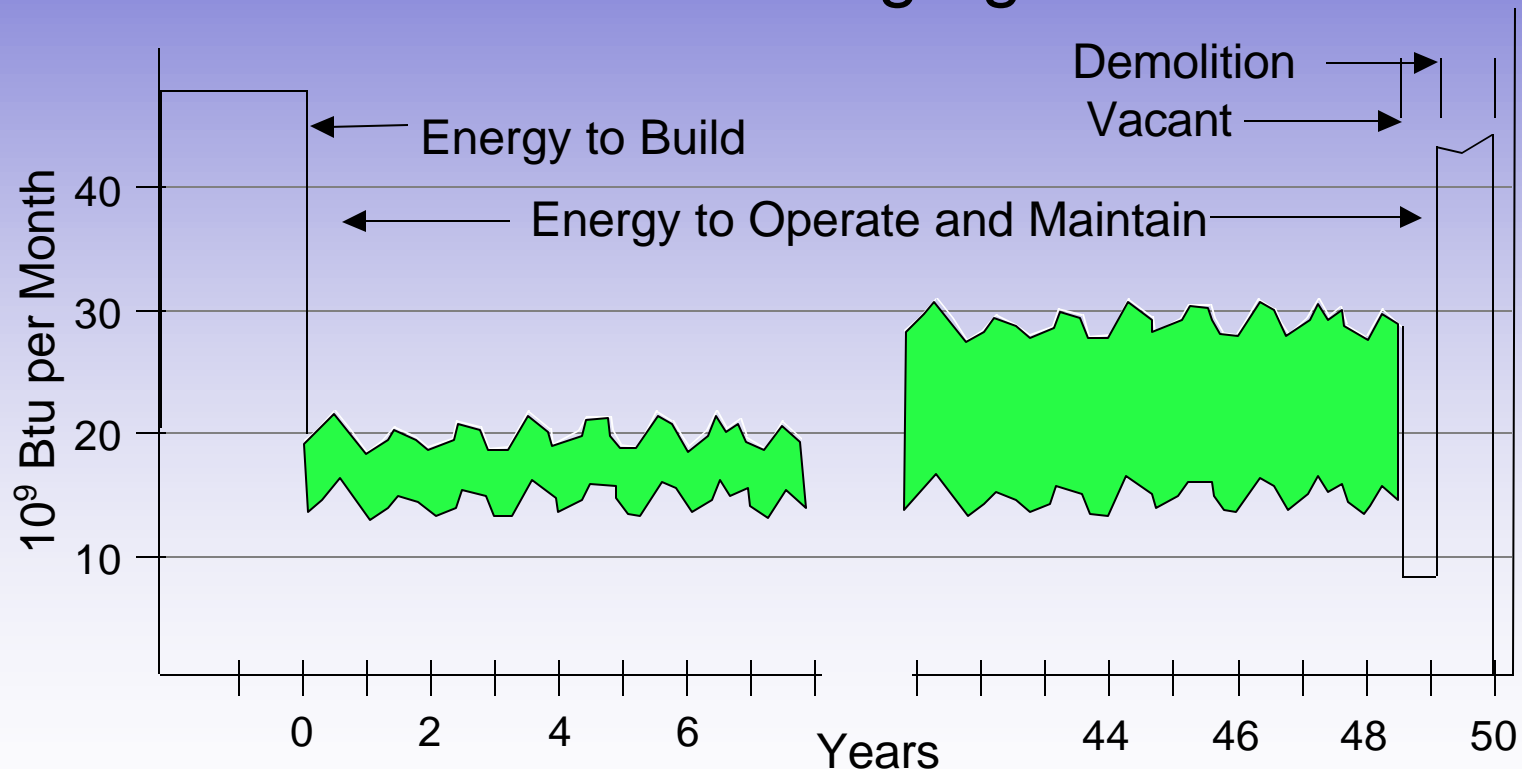
# Building Energy Consumption

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- A typical building consumes more energy in its lifetime than in construction
- Better insulated building envelopes require more energy to build, but save much more over their lifetimes
- Higher efficiency HVAC equipment costs more initially but usually saves more over the building lifetime
- Conservation strategies can also create major energy savings

# Building Energy Consumption

- Savings Potential
  - Increases as the building ages



# Continuous Commissioning

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- Continuous Commissioning (CC<sup>SM</sup>) evolved from O&M in the 1993 time frame.
  - LoanSTAR, a State of Texas initiative provided the funding.
- Continuous Commissioning development is on-going.
  - CC has averaged over 20% savings in over 100 buildings in Texas
  - CC improves comfort
  - CC makes energy savings sustainable

# Continuous Commissioning

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- Process whereby the energy using systems in a central plant or building are analyzed and optimized
- Metering and monitoring of the facility before and after Continuous Commissioning
- Training of facility staff is essential
- Provides follow-up services to insure continued performance
  - Monthly feedback on status of savings and graphics of consumption
  - Additional visits to further fine tune

# Continuous Commissioning

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- Continuous Commissioning can be used:
  - In a stand alone for a short term payback
    - CC alone typically achieves under a 2 year payback
  - Bundled with a mechanical retrofit to reduce the payback time
    - Often needed mechanical retrofits cannot be justified based on savings alone. CC has proven to be of high value in bringing projects into a reasonable payback time
  - After a retrofit is completed, CC can improve the project financials
    - Some projects do not achieve the estimated savings. CC has been used to improve the savings

# The CC Process

- Improve comfort and increase the productivity
- Reduce building energy consumption
- Reduce maintenance costs
- Improve the technical knowledge of in-house operating staff
- Pay back in less than 2 years without retrofits

Step 1

Initial Survey  
Estimate ECM's / Savings  
Specify Monitoring  
**Involve Facility Staff**

Step 2

Install Monitoring  
Develop Energy Baseline  
**Involve/Train Facility Staff**

Step 3

Survey Facility  
Quantify / Prioritize ECM's  
Solve O&M Problems  
**Involve Facility Staff**

Step 4

Commission Major Equipment  
Additional O&M Problem Solving  
**Involve/Train Facility Staff**

Step 5

Commission Entire Building  
Additional O&M Problem Solving  
**Involve/Train Facility Staff**

Step 6

On-Going Monitoring / Analysis  
Feedback Results to Staff  
Revisit Building Yearly  
**Involve/Retrain Facility Staff**

Brooks Energy and Sustainability Laboratory

# Memorial Student Center



Texas A&M Campus



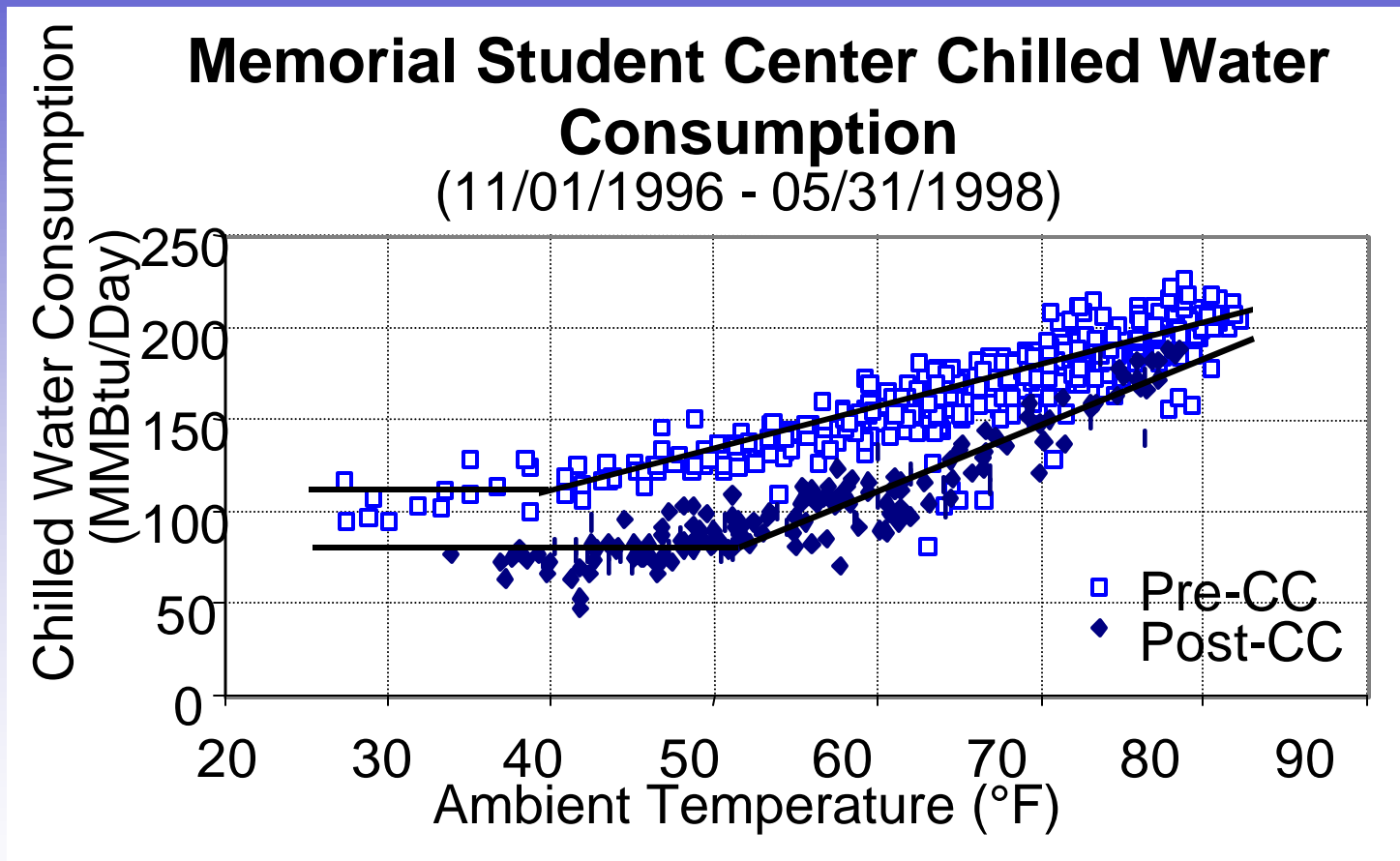


# Major CC Actions

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- Optimized air distribution
- Optimized water flow
- Readjusted the overlap of the spring range of the control valves
- Calibrated faulty thermostats

# Memorial Student Center Commissioning



# Savings at MSC

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- September '97 - April'99

Chilled Water	\$60,100
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Hot Water	\$81,600
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Electricity	<u>\$24,600</u>
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	\$166,300
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# Kleberg Building

Texas A&M Campus



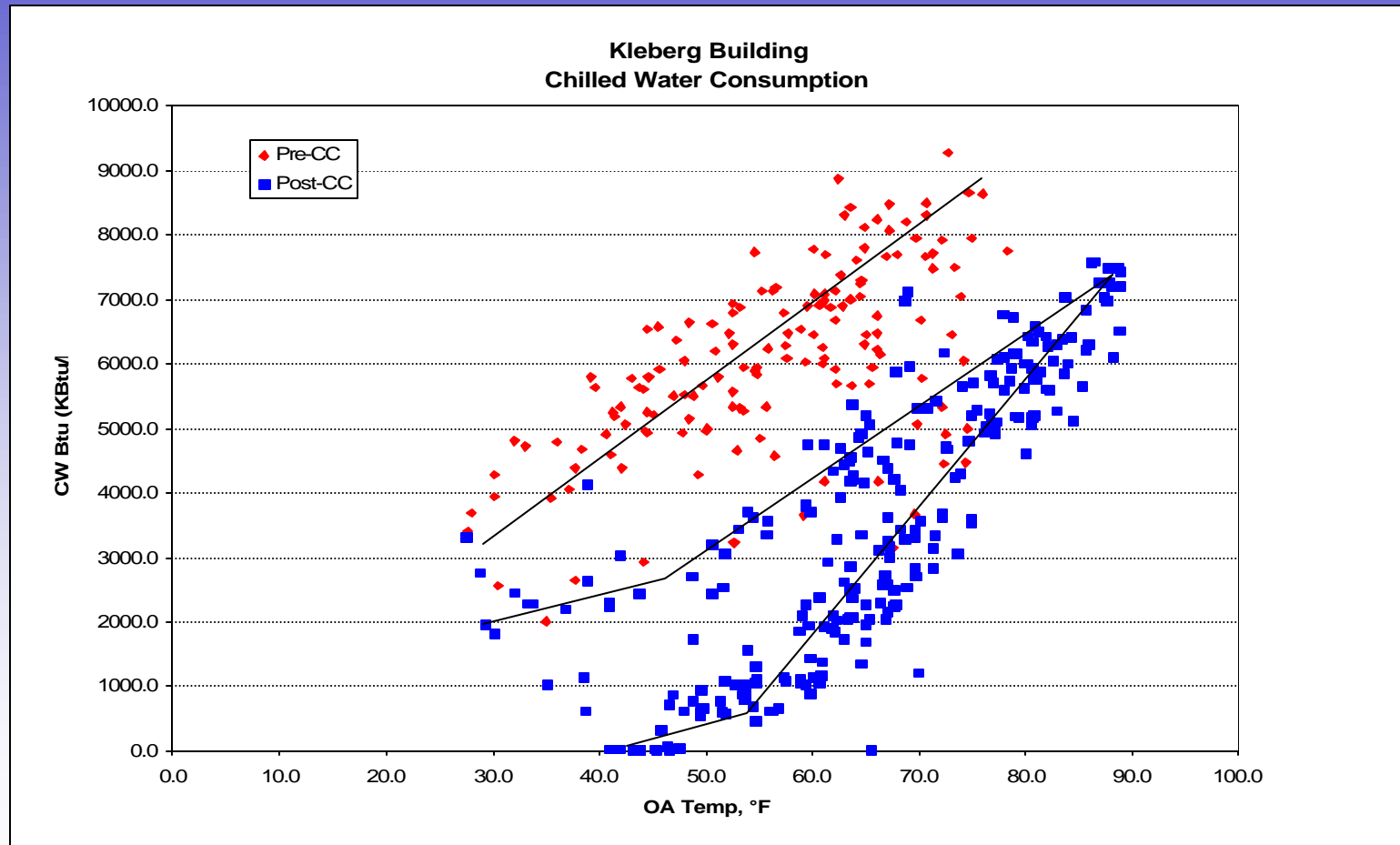
# CC Measures Kleberg Building

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1. Reset Cold deck & Preheat Schedule.
2. Utilize Economizer Cycle.
3. Perform Lab Air Balance.
3. Reduce Building Pressure from 0.05" to 0.03" H<sub>2</sub>O.
4. Reduce Exhaust Duct Pressure from 3.0" to 0.75" H<sub>2</sub>O.
5. Optimized CHW Pumping Control.

# Comparison of Heating Consumption Kleberg Building

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# Measured CC Savings Kleberg Building

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- Measured Savings  
(Jun '96 to April '99)  
HW = \$457,709  
CHW = \$638,896  
Total = \$1,096,605

# Conclusions

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- CC begins with operations and maintenance activity
- CC solves comfort problems
- CC maintains long term high efficiency performance
- Typical pay back of the energy costs is less than two years
- CC can be tailored to meet different requirements